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INDO-PACIFIC FISHERIES COUNCIL

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No. 13 JULY, 1954

CEYLON

Fisheries Programme :- Mr. E.R.A. de Zylva continues to act as Director of Fisheries. There is an extensive mechanization programme in which there is active co-operation between Mr. A.W. Lantz, Director of the Canadian Aid under the Colombo Plan and the FAO Technical Assistance Programme. Mr. Alan Glanville, FAO Fisheries Expert charged with demonstrating mechanized fishing methods from small craft, particularly in the Jaffna area, has proceeded to his home upon the conclusion of his assignment. Mr. Einar Kvaran, in charge of the mechanization of the boats, continues his assignment. Two trawlers are working out of Colombo, the "Braconglen" which is the property of the Government, and the "Maple Leaf" provided by Canadian aid. The old "Raglan Castle" is out of commission. There are two further 45-foot multi-purpose Canadian boats, the "North Star" and the "Canadian" which are engaged in exploratory fishing under Canadian skippers. Dr. C. Medcof, senior biologist of the Atlantic Biological Station of the Fisheries Research Board of Canada, will advise the Ceylon Government on the biological study of the catch of these and the other larger boats.

Other items which have been or will shortly be contributed by Canada to the fisheries programme are; a 500-ton cold storage with 15-ton blast freezing capacity and 30-ton ice plant; a by-products factory with plants to deal with shark-liver oil, fish drying, fish meal and a small amount of canning; a machine shop and storage for gear; all the above to be in the vicinity of the new fish harbour for the use of the trawlers, to be formed by the construction of a breakwater between the commercial harbour and the present small-boat fishing harbour. Some forty diesel engines and a number of outboard motors are to be supplied by the Colombo Plan for installation in small fishing boats, as well as a number of insulated trucks and small dories and other vessels, including an experimental "oru" based on the local design but of light construction; nylon gill nets, hooks and lures and other material, laboratory equipment, radio transmitter-receiver and a station wagon equipped with radio.

FAO Technical Assistance :- Upon conclusion of his assignment, Mr. Alan Glanville (U.K.) returned to Rome and prepared the final report on his work over the last three years as FAO fishery engineer in Ceylon. He has since been repatriated to his home. The three 10 h.p. diesel engines provided by FAO and installed in local fishing craft in 1952 and 1953, have been made over to the Ceylon Government and purchased by

the fishermen in whose craft they were installed. Small craft mechanization is now an important feature of fisheries development in Ceylon.

Japanese Fishing Boats :- Two mechanised fishing boats are to be brought shortly from Japan by the Duwa Fisheries Co-operative Sales Society for use in Ceylon. The boats will at first be manned by a Japanese crew, and after a time, a boatyard would be set up at Duwa and fishing boats (modelled on the Japanese type) constructed there from local wood. Fishing nets and other gear will also be brought from Japan.

HAWAII

Pacific Oceanic Fishery Investigations :- During a recent 53-day oceanographic voyage the U.S. Fish & Wildlife Service Research Vessel, *Hugh M. Smith*, made detailed observations of the chemical and physical characteristics of the potential albacore tuna fishing grounds north and east of Hawaii. This completes the survey of which the recent experimental fishing trip of the *John R. Manning* was a part.

Mr. J.W. McGary, Field Party Chief, reported that the *Smith* occupied 89 hydrographic stations at which water samples for chemical analysis were collected at thirteen depths between 0 and 4,000 feet and net hauls were made at each station between the surface and 600 feet to sample one of the fish foods, the zooplankton. At each station and at frequent intervals between stations bathythermograph lowerings were made to determine sub-surface temperature structure and the surface currents measured by means of an underway current meter.

This is stated to be the most thorough oceanographic study that has ever been made of this area, and it is expected that the information collected on this cruise will add greatly to a better understanding of the fish productivity and complicated current systems in the area.

INDIA

Central Government :- Under an operational agreement of the U.S. FOA Programme (1952), the cutters M.T.S. Ashok and M.T. Pratap were renovated in 1953. Four Japanese master fishermen and two engineers have been employed to conduct bull trawling and to train the local hands. The two vessels commenced fishing on 22nd December, 1953. They made 5 trips from 22.12.53 to 13.3.54, being absent from port for 54 days as follows :-

Voyage No.	*Total Fish landed*	*No. of days absent from port*	*Quantity of fish landed per day's absence*
1	27.0 tons	9	3.0 tons
2	33.0 ,,	11	3.0 ,,
3	48.0 ,,	12	4.0 ,,
4	49.0 ,,	11	4.45 ,,
5	47.5 ,,	11	4.32 ,,

The results of the bull trawling operations conducted so far are quite encouraging.

Dr. W.H. Rich of Stanford University has accepted a three months' assignment as consultant in fisheries under the U.S. FOA programme of technical assistance and will work in close contact with Mr. Ole Heggem. This is Dr. Rich's second visit to India.

Dr. S.L. Hora, Director, Zoological Survey of India and Honorary Secretary-General, Indian Board for Wildlife, has been appointed, with the approval of the Govern-

ment of India, Fish and Wildlife Adviser to the Damodar Valley Corporation with effect from 15th July, 1954, for a period of two years. He will carry on the work of the DVC in addition to his normal duties in the Zoological Survey of India.

Value of Fishery Output :- According to the Final Report dated February 1954 of the Indian National Income Committee, the net value of output in fishery in India is as follows :

in Rs. Crores (1 crore = ten milion)

	1950-51	1949-50	1948-49
(1)	(2)	(3)	(4)
1. Value of freshwater fish sold in the markets. .	9.5	9.8	9.3
2. Value of own consumption of freshwater fish by producers, etc.	6.4	6.6	6.3
3. Value of total catch of freshwater fish	15.9	16.4	15.6
4. Value of total catch of sea fish	12.0	11.5	8.7
5. Total value of product	27.9	27.9	24.3
6. Less 5 p.c. of (5) for depreciation and cost of materials	-1.4	-1.4	-1.2
7. Net value	26.5	26.5	23.1
8. Plus value added by salting and sun-drying . .	2.1	2.0	1.5
9. Plus 25 p.c. of (7) for fish caught by persons other than fishermen	6.6	6.6	5.8
10. Net value of fishing	35.2	35.1	30.4
11. Net value of output of gatherers of chanks, pearls, seaweeds, shell etc	0.8	0.8	0.7
12. Contribution to national income	36.0	35.9	31.1

Andhra :- The Director of Agriculture of the new State of Andhra dealing with fisheries is Mr. M. Kanti Raj with headquarters at Karnool. Mr. Rama Mohan Rao is Deputy Director of Fisheries.

Bombay :- Dr. S.B. Setna is on leave prior to his retirement as Director of Fisheries. Dr. C.V. Kulkarni is acting as his successor.

Under the State Aid to Industries Rules, 1935, loans are advanced to fisheries and their co-operative societies for purchase of trucks for providing quick transport of fish to prevent its spoilage. More than 60 trucks, some of which are insulated, are owned at present by individual fishermen and fish merchants, and increasing quantities of fish are finding their way to the markets in the interior. Over 1,100 tons of fresh fish were thus transported from fishing centres in Kanara and Ratnagiri districts to Kolhapur, Belgaum and Hubli.

A new one-storied market has been constructed at Bombay at a cost of Rs. 550,000 as part of the programme for regulation of markets and establishment of planned marketing premises for fish trade. A fish market has also been opened on Grant Road providing sufficient space to traders to display their goods. Further, fish markets have been established at Karwar, Majali, Ankela and Bhatkal. Extensions and improvements have been effected to the fish markets at Baroda and Kolhapur.

Madras :- Mr. K. Anantaraman, until lately Director of Fisheries, has opted for transfer to the new State of Andhra where he will, unfortunately, not be directly engaged on fisheries work. He informs the Council of his continued interest. The Madras Directorate of Fisheries has been absorbed into that of Industries, and the new Director is Mr. E.P. Rayappan. Messrs. V. John and D.D.

Peter Devadas continue as Deputy Directors of Fisheries.

Travancore-Cochin :- Norwegian Commodity Development Project - In accordance with a tripartite agreement among India, Norway and the United Nations, about 500 tons of equipment for the Norwegian-aided fisheries project at Neendakara near Quilon, have arrived at Cochin from Norway. A workshop for boat building is now under construction, and plants for the drying of fishing nets have been erected. A broad beamed fishing vessel of 32 feet length with aluminium hull and fitted with a 12 h.p. "Saab" engine and Bendix depth recorder has also arrived. Motors for installation in existing craft have been offered for sale to fishermen's co-operative societies within the project area. Four groynes have been constructed and experiments in connection with the beaching and launching of fishing craft are in progress.

West Bengal :- Dr. Baini Prashad has retired from the Directorate of Fisheries and has been succeeded by Dr. K.C. Saha. Dr. Prashad was the first Chairman of the Indo-Pacific Fisheries Council and he continues to have a keen interest in its activities. Although retired from the service of the Government of West Bengal, Dr. Prashad continues his active work as a biologist and will welcome correspondence from old friends at 10 Dobhalwala Road, Dehradun, U.P., India.

INDONESIA

Sea-Fish Output in Northern Central Java:- According to "Indonesia", Vol. VI, No 276 of 15th March, the sea-fish output in Northern Central Java during January amounted to over 1,601 tons which yielded net proceeds of Rp. 3,686,270.80. In comparison with the output in December, 1953, which amounted to 1,962 tons yielding net proceeds to the equivalent of Rp. 4,232,683.05, the January output decreased slightly.

JAPAN

Fish Catches in 1st Half of 1953 :- According to a recent announcement of the Ministry of Agriculture, the total fish-catch in the period January to June 1953 reached 1,871,250 metric tons, showing a decline of 113,250 metric tons or 6% below the corresponding period of the previous year.

KOREA

Fish Production on the Increase :- The Commercial Fisheries Review for February, 1954 cites a 6% increase in marine products output in 1952/53 in Korea as a result of improved fishing equipment and supplies provided by the United Nations Korean Rehabilitation Administration.

The Review for March proceeds to cite the seaweed production in the Repulic of Korea (South Korea) in 1952 as amounting to 18,283 metric tons which is about three times the 1948 production of 6,446 tons.

Most of the agar agar produced in Korea is exported to Hong Kong or Japan.

PHILIPPINES

Revival of Freshwater Fishery Station :- The Tanay Freshwater Fishery Experimental Station which had been abandoned during the Japanese occupation is being reconstructed and expanded into a 3-hectare fish propagation farm out of some 60,000 pesos made available for the purpose. Once rehabilitated, it will again be the source of seed fish to replenish the depleted fishery of Laguna de Bay, a freshwater lake of about 97,000 hectares, upon which the thousands of people living around are wholly dependent. It can furnish stock for distribution to other inland bodies of water throughout the Philippines,

and to other government entities and the many people who have become fishpond-minded. It can help to encourage people make use of some 10,000 hectares of marginal lands, largely freshwater marshes around the lake, which may be reclaimed and converted into productive fishponds. It will also become a centre of scientific investigations aimed at improving freshwater fish culture techniques.

Fishermen's Training :- Fourteen fishermen trainees of the Manual A. Roxas Memorial School of Fisheries under the Bureau of Fisheries, were graduated on April 5, 1954. They represent a cross-section of the various municipalities of Cebu Province from north to south and some neighbouring provinces. This batch of graduates is the second group to be graduated since the school was placed under the control and supervision of the Bureau of Fisheries and transferred to its permanent site at Daanbantayan, Cebu. This will bring the total number of graduates to 47, the majority of whom are now actively engaged in fishing while others are college students.

Fish Culture Activities :- In response to the demand for services of fish culturists in the provinces, the Bureau of Fisheries, with the co-oparation of the Bureau of Agricultural Extension and private fish pond operators, is conducting in-service training in fish culture for extension service workers. The course consists of lectures, field trips and practical demonstrations.

A conference of Chanos fry concessionaires, dealers and nursery operators and fish pond operators was held at the Bureau of Fisheries on April 27, 1954. The formation of a co-operative organization in connection with the production, handling and distribution of Chanos fry and fingerlings in the Philippines was discussed. In the afternoon of the same day a hearing was held at the office of the Export Control Commission to obtain the views on the exportation of Chanos fry.

Drive Against Fishing Offences :- A conference of the various law-enforcement agencies, viz., AFP, Constabulary, the Philippine Navy, the Bureau of Health, the Police Departments of the cities of Manila and Pasay and of the municipalities of Navotas and Malabon, the National Bureau of Investigations, and the Bureau of Customs has been arranged with a view to co-ordinating their activities in connection with an all-out drive against illegal fishing especially by use of explosives.

FOOD AND AGRICULTURE ORGANIZATION

Fish Marketing Training Centre, H'Kong:- At the invitation of the Government of the United Kingdom, the Food and Agriculture Organization of the United Nations has, in co-operation with the Government of Hong Kong, the Indo-Pacific Fisheries Council and the participating Governments of the Indo-Pacific Region, organized a Training Centre on Fish Marketing. The Course is being held from July 12 to August 21, 1954 at the University of Hong Kong.

Mr. J.T. Wakefield, Director of Marketing, Hong Kong, will function as Director of the Centre and Mr. C. Beever, Fisheries Economist, FAO, Rome, as Co-Director. The lectures will be given by a group of instructors drawn from the Hong Kong Government, the Hong Kong University and the F.A.O. The Course will cover fish marketing matters and organization. Demonstrations and discussions will be held on special regional problems to provide a groundwork of knowledge which can usefully be applied to the solution of marketing difficulties in the countries of the Indo-Pacific Region.

As this goes to the Press, 30 officers, representing 11 Member Governments viz, Burma 2, Ceylon 2, India 6, Indonesia 2, Japan 2, Pakistan 3, Philippines 2, Thailand 3, the United Kingdom (for Hong Kong 5 and Malaya 1) and Vietnam 2, have been nominated to undergo the Course.

Officers' Travels :- Dr. D. B. Finn, Director, Fisheries Division, who has been

visiting Vancouver, Tokyo and Hong Kong, arrived in Bangkok on 29th June and after holding a number of discussions with officers of the Government of Thailand, the Far East Regional Office of F.A.O. and the ETAP, left on July 6 for Rangoon en route to India, Pakistan and Rome.

Dr. Cecil Miles will leave for Hong Kong on 7th July. After participating in the opening of the FAO/ETAP Fish Marketing Training Course he will proceed to Tokyo to attend the Meeting of the International Whaling Commission. Thereafter he will go to Colombia on home leave and return to Bangkok in December.

Dr. T.J. Job returned to Bangkok on May 31 from his home leave in India.

Miss A. Jiannee will leave on July 3 for Hong Kong to offer administrative assistance at the Fish Marketing Training Centre. After the termination of the Course she will proceed on leave and return to Bangkok towards the end of September.

GENERAL FISHERIES COUNCIL FOR THE MEDITERRANEAN

We regret to learn that Prof. Jean Le Gall, first Chairman of the GFCM died on February 6th, 1954, after a long illness.

The Executive Committee of the GFCM met in Rome, FAO Headquarters, on 26-27 February, 1954 and in Algiers on 28-29 July, 1954.

The GFCM has arranged in respect of its Committee work: that the chairman of each technical committee recommend a special rapporteur for each of the questions which will be discussed before the next meeting of the Council; that each special rapporteur be asked to prepare a programme of study for the question(s) presented to him; that, by the intermediary of the GFCM correspondents, the programmes of work thus set up be submitted to competent experts who, subsequently, will make known the nature and extent of the contributions they intend to put before the Council at the next meeting.

Eleven governments are now members of the GFCM: Egypt, France, Greece, Israel, Italy, Monaco, Spain, Tunisia, Turkey, United Kingdom and Yougoslavia.

The Principality of Monaco has invited the GFCM to hold its Third Meeting in Monaco from 14-19th October, 1954. IPFC will be repreaented at that meeting.

INDO-PACIFIC FISHERIES COUNCIL

Executive Committee Meeting :- The 2nd Meeting of the Executive Committee of the Indo-Pacific Fisheries Council was held at Bogor in Indonesia from the 11th to the 17th of June. Mr. Boon Indrambarya, Chairman, Mr. J.A. Tubb, Vice-chairman, Monsieur R. Serene, Retired-Chairman and Dr. Cecil Miles, Secretary attended.

Publications :- Attention is brought to the fact that a sales policy has just been established for IPFC publications. This will apply only to a limited number of the more important publications and will not affect the previous arrangement with Member Governments, Institutions, Libraries etc. This arrangement will provide a means whereby individual workers from whom requests for the Council's literature are being received in increasing numbers, may acquire copies.

Orders for publications may be placed with the Chief of the Publications Section, FAO Informational and Educational Services, Rome.

Publications available:

Proceedings, Part I, containing a record of Meetings, including reports of technical committees, are available in respect of the 2nd Meeting (Cronulla), 3rd Meeting (Madras), 4th Meeting (Manila) and 5th Meeting (Bangkok). $ 1.00 (5/-) each issue.

Proceedings, Parts II &III (one volume), containing technical papers on hydrology, plankton, general fisheries biology, fishing craft and gear and food technology in the Far East, are available in respect of the 2nd, 3rd and 4th Meetings. $ 1.50 (7/6) each issue.

Fish Culture in Brackish-Water Ponds of Java, by W. H. Schuster, 1952, 143 pp., 25 plates and 8 text figures. Gives a general description of the extensive traditional brackish-water fish culture practices in Indonesia, dating from before 1821. Only a few copies of the first edition are available. A second revised edition of this study is in preparation. $ 1.50 (7/6).

The Secretariat is informed of the following additional information in respect of the *IPFC List of Scientific and Other Periodicals published in the Indo-Pacific Area*, 2nd Edition (Revised), 1953, on page 29, under "Indonesia".

"De Tropische Natuur" reappeared in 1952, Vol. 32, with 4 issues a year, and 32 pages per issue. It is obtainable from the Society of Natural History in Indonesia, c/o Museum Zoologicum Bogoriense, Bogor, Indonesia, being sent to members without charge. Subscription : Rp. 25 per annum, or Dfl 8. It contains papers in Indonesian, Dutch and English, but papers in French, Spanish and German will be accepted (summaries in English). Starting from 1954 the periodical will be continued under the Indonesian name "Penggemar Alam".

GENERAL

Conference on Sea Water Pollution :- The Daily Report for May 24, 1954, of the United Nations Overseas and Special Feature Service has announced that the Secretary General Dag Hammarskjold has drawn the attention of the Economic and Social Council to "the satisfactory results" of the recent London Conference on Sea Water Pollution, which ended on 12 May and at which 42 nations voted a Convention which, among other things would require all oil-burning vessels and all tankers to keep comprehensive records of oil discharged at sea. The Secretary-General was represented at the Conference.

The Conference also adopted several resolutions, one of which asked the United Nations to undertake "the collection, analysis and dissemination of information about oil pollution in various countries, and in particular technical information about port facilities for the reception of oily residues and the results of research into the problem of oil pollution generally; and to keep the problem under review".

Seaweed Research :- The Seaweed Institute, Inveresk, Midlothian, Scotland, has now issued its Annual Report for 1953. The publication deals with Seaweed Ecology and Survey, Microbiology, Plant Physiology, Mechanical Engineering, Process Development, Algal Chemistry, Agricultural Uses of Seaweed and the general programme of the Institute.

PUBLICATIONS

On the diurnal variation of oxygen content in surface layers of the hydrosphere, by Y. Sugiura, Meteorological Research Institute, Mabashi, Suginami, Tokyo, Japan. Papers in Meteorology and Geophysics, 1953, Vol. 4, No. 2 :- In eutropic lakes or coastal waters, a marked diurnal variation of oxygen content is found. There are two types of variations. In one of them, a minimum occurs mostly at about 6h. and a maximum at about 17h. This type of variation is often seen in stable and homogeneous water masses. In the other type, minimum and maximum occur at different hours from the above-mentioned and the influence of diffusion and advection or convection upon the diurnal variation of oxygen content must be considered. In the former type, the amplitude of the diurnal

variation depends upon the intensity of radiation, the duration of insolation, water temperature, number and size of phytoplankters, etc. The amplitude is larger on clear than on cloudy days and is larger in summer than in winter. By using the data of the diurnal variations of dissolved oxygen, the amount of oxygen production or consumption is computed.

The chlorinity determination of sea water by micro-analytical method, by K. Saruhashi, Meteorological Research Institute, Mabashi, Suginami, Tokyo, Japan. Papers in Meteorology and Geophysics, 1953, Vol. 4 No. 2:- In this method it is required to take only 1.5 ml. of sea water which is one tenth of the quantity sampled by the standard method. Consequently, the quantity of silver nitrate solution is also reduced proportionately.

A pipette and a burette are specially made. The graduation of the burette is the same as in the Knudsen's burette which makes it possible to read chlorinity directly. The author used a mixed solution of uranin and starch as an indicator. The mean deviation of this method is about 0.01 °/oo. Another advantage is stated to be the saving in time.

Fishscope—the new fish finder. Anon. Fishing gazette, New York. Feb. 1954, 71:- The Fishscope, manufactured by the Edo Corporation, consists basically of a unit which is mounted in the wheelhouse and which gives the captain an actual view on a television tube of the ocean bottom and other submerged objects. It has a range of 0 to 250 fathoms and, because of the relatively large size of the picture tube, it readily picks up schools of fish below. Once such a school is spotted, the Fishscope magnifies that particular view 25 times, permitting in some cases actual identification of individual fish.

The following papers appear in the Philippine Journal of Fisheries, Dpt. of Agriculture & Natural Resources, Manila, Philippines.

A Bibliography of Philippine Fishes and Fisheries, by G. J. Blanco and H.R. Montalban.

The thermal structure of the surface waters off Western Philippines based on Bt. Observations, by T. G. Megia and A. R. Sebastian.

Oceanography in the Philippines, by A. R. Sebastian.

The rate of Algae (LUMUT) Production in the Dagat-Dagatan Salt-Water Fishery Experiment Station Fishponds, by H. R. Rabanal, R. S. Esguerra, J. V. Lopez, A. M. Aldana, V. R. Ramos and S. S. Feliz.

Enumeration of algae in Philippine Bangos Fishponds and in the digestive tract of the fish with notes on conditions favourable for their Growth, by R.S. Esguerra.

Progress in Pacific Oceanic Fishery Investigations, 1950-53, by O. E. Sette *et al.* U.S. Fish and Wildlife Service Special Scientific report: Fisheries No. 116. Washington, D.C., U.S.A., February, 1954:- This publication gives an account of the exploratory surveys of the P. O. F. I. in the tropical Pacific for three years with an explanation of the equatorial current thesis developed as a result, a consideration of surface temperature and nutrient contents of upwelled waters, the resulting zooplankton and yellowfin tuna abundance, with a comparison between the catch rates in the equatorial Pacific by Japanese commercial concerns and by P.O.F.I., distribution of tuna populations and spawning with an attempted raciation study. Data are also given of yellowfin catch obtained by the nine Japanese mothership expeditions to the Western Equatorial Pacific i. e. to the northeast of New Guinea in 1950 and 1951, which shows the abundance of tuna to be greater near the Equator. An extensive bibliography and list of available translated works is appended. The Executive Committee of the IPFC believes that this publication will constitute a concise guide to the type of practical oceanic investigations which, it has been recommended Member Governments of the Council should undertake and the Council should co-ordinate under a co-operative oceanographic programme.

Longline Fishing for Deep-Swimming Tunas in the Central Pacific, Jan.-June, 1952, by G. A. Murphy and R. S. Shomura. Fish and Wildlife Service Special Scientific Report, Fisheries No. 108. Washington, D.C., U.S.A., August, 1953:- Sets out some of the preliminary data leading to the conclusions arrived at in the previous work.

Experimental Transportation of Live Shad past Susquehanna River Dams, By C. H. Walburg, Fish and Wildlife Service Special Scientific Report, Fisheries, No. 114. Washington, D.C., U.S.A. January, 1954:- Describes the experimental transportation of shad past the dam in tank trucks. It is emphasized that before the best means of overcoming obstacles to fish migrations resulting from hydro-electric projects can be ascertained, much more basic biological and hydraulic information is needed than at present exists.

Friday Harbour Laboratories, University of Washington, Seattle 5, Washington, U.S.A.:- Describes research facilities offered by these Laboratories to advanced workers at all times and the Summer Course of Instruction in Algology, Zoology, Oceanography etc. Applications for admission should be made to the Director, c/o Department of Oceanography, University of Washington, Seattle, 5.

Technical Report on Fishing Boats of the Japanese Fisheries Agency (Fishing Boat Laboratory of the Production Division, Fisheries Agency, Ministry of Agriculture & Forestry, 2/2 Kasumigaseki, Chiyoda-ku, Tokyo, JAPAN). No. 3, March 1852 and No. 4, December, 1953 (In Japanese with English abstract):- Describes investigations being carried on in respect of improvements in the design of hull, engine, instruments (including ultra-sonic horizontal and vertical fish finders) insulation etc. Rationalization and mechanization of fishing methods have been emphasized in Japan for many years and the fisheries have been extended from coastal waters to the high seas in the course of a few years as the result of improved fishing boat design. Soon after the war the Fisheries Agency commenced its studies on fishing boats and many of the results have been put to practical use.

Artificial fertilization of Lakes and Ponds, by J. A. Maciolek. Fish and Wildlife Service Special Scientific Report, Fisheries No. 113, Washington, 25, D.C., U.S.A. January, 1954:- Artificial enrichment is dealt with in relation to the environmental factors in ponds and lakes. North American, Asian and European literature is reviewed.

Use of electricity in the control of sea lampreys: electromechanical weirs and traps and electrical barriers, by Applegate, Vernon C., Smith, Bernard R., and Nielson, Willis L. Special Scientific Report: Fisheries No. 29. United States Department of the Interior, Fish & Wildlife Service. In English:- Gives an account of experiments conducted in 1951 and 1952 with electromechanical and electrical barriers for the blocking and/or capture of sea lamprey runs in tributary streams of northern Lake Huron and northern Lake Michigan. Presents details on structural characteristics, experimental manipulations and effects on sea lampreys and other fish.

Trial of Denil-type fish ladder on Pacific Salmon, by Fulton, A., Gangmark, A., and Bair, H. Special Scientific Report: Fisheries No. 99, 1953, Fish & Wildlife Service. In English:- Gives a short history of the development of the Denil-type fish ladder, and discusses the results obtained by observing the number of blueback and chinook salmon using a ladder of this kind installed side-by-side with a pool-type ladder at Dryden Dam on the Wenatchee River.

Pasteurization of crab meat, by J. V. Anzulovic & R. J. Reedy, Fish and Wildlife Service, Fishery Leaflet 415, Washington 25 D.C., U.S.A., February 1954:- Conclusion: From experiments conducted, the following conclusions were arrived at:-

1. Pasteurization does not in any way impair the color, aroma, or taste of crab meat.
2. Pasteurization kills a large number of organisms including *E. coli*.

3. The pasteurizing temperatures and times recommended for use in crab meat plants are 160°F. for ten minutes or 170°F. for one minute.

4. The average crab meat plant can use its present equipment with the addition of a can sealer.

Report on the Tilapia & Other Fish & Fisheries of Lake Nyasa, by Rosemary H. Lowe. H. M. Stationery Office, London, £ 2. 0. 0:- Reviews the systematics, growth, life history and fisheries based on the four endemic species of *Tilapia* of Lake Nyasa, *T. squamipinnis*, *T. saka*, *T. karongae* and *T. lidole*, inhabiting the deeper waters, with some information on the non-endemic shore inhabiting *T. melanopleura* and *T. shirana* of which, however, insufficient material was obtained for valid conclusions to be drawn. The endemic complex differs basically from the species which has been cultivated in the Far East since its escape in Java some time prior to 1939, *Tilapia mossambica*, in that it requires some three years to reach maturity whereas *mossambica*, under culture conditions in the Far East, spawns after only three months.

Disease as a Factor in Natural Mortality of Marine Fish, by A. Oppenheimer and G.L. Kesteven. Contribution from the Scripps Institution of Oceanography, University of California, La Jolla, California, U.S.A. New Series No. 656. Also FAO Fisheries Bulletin, Vol. 6, No. 6, 1953.

Inland Fisheries project in Thailand, by S. W. Ling, FAO Fisheries Bulletin, Vol. 6, No. 6, 1953.

Bread from the Sea, by W. Davidson. Colliers, Crowell-Collier Publishing Co., Springfield, Ohio. April 16th, 1954:- A layman's description of the experiments being carried on in Japan by Dr. Hiroshi Tamiya, by Dr. H. A. Spoehr of the Carnegie Institution at Stanford, California, the Arthur D. Little Company in Cambridge, Mass. and others. Although the direct use of phyto-plankton for human consumption, which would short-circuit what is assumed to be a wasteful process of utilizing the natural production of the sea at a higher stage in the food chain, is still in the experimental stage, it is predicted by some that algae (particularly *Chlorella*) will be available for food in some countries within a few years. Mention is made of experiments with plankton in Venezuela as a source of concentrated food for hospital patients, although it is not clear whether the forms used were phyto- or zoo-plankton. The use of plankton as food in Thailand, which was brought out at the Symposium jointly sponsored by UNESCO and IPFC in connection with the latter's 5th Meeting in Bangkok, is also cited, although the erroneous impression is gathered that significant quantities of phyto-plankton are used.

The biology of the grey mullet, Mugil tade forskal, with notes on its Fishery in Bengal, by T. V. R. Pillay. Proc. Nat. Inst. Sci. India, Mathura Road, New Delhi, India, 1954, 20 (2) March - April:- A detailed description of *M. tade* is presented and the extent of distribution of the species in India is recorded. It is inferred that the stocks on the Contai Coast and in the estuary of the Matlah River form a homogeneous population.

The weight of the fish is found to increase as an exponential function of its length and the equation for the curve is $W = 0.0337L^{2.6198}$. From the fluctuations in the ponderal index it has been inferred that the fish attains maturity for the first time when it is about 23.0 cm in length.

The juvenile fish feed on unicellular floating or attached algae and the adults feed at the bottom on the benthic flora and decayed organic matter. A marked increase in feeding activity is noticed during the winter season, and a low feeding activity during the rainy season.

The sex ratio of *M. tade* appears to be nearly 1:1. The fish probably spawns more than once during one spawning season, which may start in May — June depending on the onset of the monsoon and last till

about September. It appears to breed away from the inshore regions.

Yearly growths during the 10 years of life appear to be of the order of 16.5, 24.6, 29.0, 34.0, 39,3, 43.8, 47.4, 52.2, 57.8 and 61.3 cm. The maximum limiting length is estimated to be 85.0 cm.

The two main migrations of the fish appear to be the seaward migration of the mature fish for spawning and the movements of the fry and fingerlings into estuaries. The presence of large schools of immature fish in the coastal waters throughout the year indicates that all the young ones do not ascend the estuaries.

Lates calcarifer forms a major enemy of the fish in estuarine waters. The parasites collected from the fish are listed. It is found that the mullet is relatively free from any large scale infection by parasites. The larger fish are more prone to parasitic attacks. In enclosed fisheries, leeches probably infest the mullet.

The fishing methods for the mullet in the estuary and the sea in Bengal are briefly described. Analysis of the catches shows that large quantities of immature fish are caught by the fishermen.

Fish culture projects in Haiti and the Dominican Republic, by S. Y. Lin, FAO Fisheries Bulletin, Vol. 6, No. 6, 1953.

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